

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

<b>In the Matter of</b>	)	
	)	
<b>Recommendations of the</b>	)	
<b>Independent Panel Reviewing</b>	)	
<b>the Impact of Hurricane Katrina</b>	)	<b>EB Docket No. 06-119</b>
<b>on Communications Networks</b>	)	

**To the Commission:**

**Formal Written Comments of  
Nickolaus E. Leggett, N3NL and Donald J. Schellhardt, Esquire KI4PMG**

The following are formal comments from Nickolaus E. Leggett, N3NL and Donald J. Schellhardt, Esq. KI4PMG, both of Virginia. We are both amateur radio operators who have participated in other Federal Communications Commission rulemaking dockets. In fact, some rulemaking dockets have been initiated in response to our jointly filed Petitions (RM-5528, RM-9208, RM-10330, and RM-11287) and to a Petition filed by Nickolaus Leggett as an individual (RM-10412).

**Introduction to the Commenters**

Nickolaus E. Leggett is a certified electronics technician and an Extra Class amateur radio operator (call sign N3NL). He holds a Master of Arts degree in Political Science from the Johns Hopkins University and a B.A. in Government from Wesleyan University. He is also an inventor with three U.S. Patents. Mr. Leggett's latest patent is a wireless bus for digital devices and computers (U.S. Patent # 6,771,935).

Donald J. Schellhardt, Esquire has recently acquired a Technician license as an amateur radio operator (call sign KI4PMG). He has been admitted to the Bar in both Virginia and Connecticut. He has also been a Government Relations attorney, of one sort or another, for more than 25 years, as well as a courtroom lawyer for 5 years. His employers have included the U.S. House [of Representatives] Republican Research Committee, U.S. Representative Matthew J. Rinaldo [R-NJ, retired], the American [Natural] Gas Association, the U.S. Environmental Protection Agency (EPA), Canyon Area Residents for the Environment, the National Antenna Consortium (NAC), Blue Ridge Legal Services, and the Superior Court of New Haven. Mr. Schellhardt also founded, and then led, The Amherst Alliance: a Net-based, nationwide citizens' advocacy group for media reform in general and Low Power Radio in particular.

Mr. Schellhardt holds a law degree from George Washington University and a B.A. in Government from Wesleyan University. This summer, he is completing his coursework for a Master of Arts in Liberal Studies (MALS) from Hollins University, with an interdisciplinary focus on Cross-Cultural Politics (Asian and U.S.).

### **Introduction to Our Comments**

In this set of comments, we amplify the core recommendations of the Independent Panel by offering specific recommendations for protection against Electromagnetic Pulse (EMP) attacks conducted by terrorists or rogue nations. While it is important to protect all vital civilian electronics equipment against an EMP strike, our most immediate goal is avoiding disruption or destruction of broadcasting and “first responder” communications.

We have already brought our concerns about an EMP strike to the Commission’s attention -- twice -- in FCC dockets RM-5528 and RM-10330.

In 1986, our jointly filed Petition for Notice of Inquiry led to Docket RM-5528, **Request to Consider Requirements for Shielding and Bypassing Civilian Communications Systems from Electromagnetic Pulse (EMP) Effects**. That Petition was denied by Commission staff, and upon appeal by the full Commission, in 1987.

In 2001, the events of September 11 motivated us to try again. Our second jointly filed Petition, this time urging a proposed rule rather than a Notice of Inquiry, led to Docket RM-10330, **Amendment of the Commission's Rules to Shield Electronics Equipment Against Acts of War Or Terrorism Involving Hostile Use of Electromagnetic Pulse (EMP)**. That Petition was filed on September 27, 2001: less than 3 weeks after the terrorist attacks on New York City and Washington, D.C. The Petition was denied by

Commission staff, in June of 2002, after which we appealed to the full Commission. This second time, however, the full Commission left our Petition For Rulemaking in limbo, neither granting nor denying our appeal of the staff's decision.

Technically, it appears that our Petition for Reconsideration in RM-10330 is still legally “alive”. The appeal has been pending since June 24, 2002 -- four years ago -- but it has yet to be either granted or denied by the full Commission. Therefore, it is not too late for the Commission to review our June 24, 2002 appeal and initiate a proposed rule, and/or other constructive proceedings, based upon the Docket RM-10330 Petition.

Both of these petitions of ours, including all documents in the related public records, are hereby included in FCC Docket 06-119 by reference.

### **An Electromagnetic Pulse (EMP) Event**

If the terrorist forces or rogue nations become sufficiently advanced, they can launch Electromagnetic Pulse (EMP) attacks against America. In a nuclear EMP attack, a rocket or mass driver is used to lift a nuclear weapon into space above the United States. The weapon is detonated at an altitude of 100 miles or more to generate an intense EMP wave that instantly burns out electronic devices, car ignitions, aircraft navigation/avionics, computers, and modern communications over a very wide area of the Nation. The nuclear EMP pulse has electric field strength of up to 50,000 Volts per meter and a very fast rise time (nanoseconds).

Another alternative is a non-nuclear EMP attack, using an explosively pumped flux compression generator (FCG). This is an explosively driven device that generates a strong local EMP wave. Unlike a nuclear EMP attack, it would not require the resources of a nation (or, perhaps, a large corporation) to be feasible. Non-nuclear EMP devices could be developed and used by terrorist groups, or conceivably even individuals, against compact but vital targets -- such as Wall Street, K Street or air traffic control towers.

### **North Korea's Technology As New Evidence Supporting EMP Protective Steps**

Recent news media have reported extensively on North Korea's new long range rocket. This rocket has sufficient range to reach the United States. The North Korean rocket is a three-stage rocket. The first (bottom) stage is a large multi-engine liquid-fueled rocket. The payload of that stage is a smaller liquid-fueled rocket. This is the second stage. The third stage is a fairly small solid-fuel rocket.

The important information here is that this complex rocket is liquid fueled.

A liquid fueled rocket has a long and complex launch preparation process, taking many days to complete. This is not the quick-fire solid-rocket technology that one uses to deter someone else's first strike. This is either a first strike (attack) weapon or a satellite launcher -- or it could be both.

EMP is an appealing first strike weapon because only one moderately

large nuclear warhead is required and the rocket does not have to be precisely aimed at a specific city or military installation. In addition, the nuclear payload is detonated above the atmosphere so a re-entry nose cone system is not required at all. This greatly simplifies the technical requirements for the design of the attacking rocket. The North Korean rocket could be used to launch an EMP strike against the United States on a scale that would cause extensive damage to our electronic communications infrastructure and to our economy.

In one scenario, the nuclear payload is orbited within an “innocent” satellite and is later detonated over the United States by remote control or automated system. This would result in an attack with no warning at all: a 21<sup>st</sup> century Pearl Harbor.

It has been estimated, in a study that is referenced in the public record of FCC Docket RM-5528, that a single 10 megaton thermonuclear (hydrogen) warhead, detonated at an optimal altitude over Nebraska, would bathe most of the continental United States in a devastating EMP wave. Because North Korea does not appear to have any hydrogen bombs, an EMP strike of nationwide proportions seems to be beyond its capabilities at present. However, using the smaller nuclear (atomic) warheads that North Korea does appear to possess, that country could still generate EMP bursts of sufficient scale to black out electronics across large metropolitan areas.

For example: A Hiroshima-sized 20 kiloton atomic warhead, detonated

at optimal attitude over Palo Alto, could “de-electrify” virtually all of Silicon Valley, from San Jose and Cupertino to Millbrae and Burlingame, with San Francisco, Oakland and Berkeley thrown in.

### **Iran’s Technology As New Evidence for EMP Protective Steps**

Although Iran appears to have no nuclear weapons at present, it is evidently intent on developing them. Further, it has recently unveiled a medium range missile, reflecting some indicators of Chinese design, which can reach Israel and parts of Western Europe.

Iran’s recent, maiden test of the medium range missile evoked some international attention for what it didn’t do. It didn’t involve nosecone re-entry. Instead of landing in the sea, as tested missiles generally do, the missile was detonated in flight -- at the optimal attitude for launching a nuclear EMP burst.

This action suggests, strongly, that Iran is not only moving toward the ability to initiate a nuclear EMP strike -- but wants its potential adversaries to know that it has EMP in mind as one of its options.

Incidentally: While the EMP wave from a single atomic bomb could not begin to blanket most of the continental United States, it might very well be sufficient to blanket all of Israel -- which is smaller than New Jersey and only slightly larger than Vermont.

### **Pakistan’s Technology As Standing Evidence for EMP Protective Steps**

Since Pakistan’s “conversion” to accommodation with the West,

following the intense pressure after September 11, 2001 and the arrival of U.S. troops shortly thereafter, its potential for threatening the United States and/or U.S. allies has been largely ignored. Indeed, it was largely ignored before September 11, 2001.

Nevertheless -- as we pointed out in FCC Docket RM-10330 -- Pakistan provided safe havens for Al Qaida members and other terrorists for years, and continues to maintain a borderline Jihadist outlook. In a partial vindication of our submissions in FCC Docket RM-10330, Pakistan has since been caught both exporting nuclear weapons technology to Libya and importing missile technology from North Korea.

Now, as it did before September 11, 2001, Pakistan maintains a fleet of medium range missiles with nuclear (atomic) warheads. Today, it could launch EMP attacks on all of India, much of Western Europe and/or much of Asia. Given Pakistan's will to amass more firepower, and its close (though under-played) ties to North Korea, it seems likely that Pakistan will continue to march toward a shift from atomic bombs to hydrogen bombs -- and from medium range missiles to long range ones.

### **The Commission's Responsibility**

Under the Communications Act of 1934, the FCC has the responsibility to take constructive and practical regulatory steps to protect our nation's communications infrastructure from developing "national security" threats, such as terrorism and/or EMP attacks. In Dockets RM-5528 and RM-10330,



we proposed complete protective rules for all of America's vital civilian communications equipment and services. Those proposals, despite support in the latter Docket from the expert testimony of Dr. William Radasky of California, were strongly resisted by the communications industries.

We continue to stand behind the reasonably comprehensive proposed rule that we presented in our RM-10330 Petition For Rulemaking. We urge the full Commission to review that Petition, and the proposed rule contained therein, as part of considering our appeal of the staff's denial of this Petition.

Most of the Commissioners of 2002 have now left -- and the door has been left ajar for the Commissioners of 2006 to take their own look at what we proposed.

It is not too late.

In The Meantime, however:

We are realistic enough to have a "fallback option" in our back pockets. If, after careful review, our original proposal in Docket RM-10330 strikes the Commission as too comprehensive -- or at least, too comprehensive to embrace in a single step -- then we ask the Commissioners to consider a "first step" that is more modest.

As this "first step", we propose the "fallback option" of a limited set of regulations, designed to mitigate but not eliminate damage to vital civilian electronics equipment and services from Electromagnetic Pulse attacks.

### **Targeted Protections**

We propose, as an initial step, that the Commission require targeted protections for the radio and TV broadcasting industries and for the public service “first responders”.

Each radio and television broadcasting transmitter should be required to have a rapidly-acting bypassing circuit in the feed line path from the transmitter output to its antenna. This bypassing circuit would deflect any incoming intense EMP pulses to the ground protecting the transmitter from damage.

This requirement is based on the concept that most of the damaging EMP pulse will be picked up by the broadcast antenna, while less damage will be inflicted by direct pick-up through the transmitter’s components. This is a reasonable assumption that could later be validated or modified by input, during the public comment stage(s), from EMP experts in the military and the private sector.

The protection of the broadcast transmitter would not protect citizens’ radio or TV receivers from damage. However, we assume that some of the consumers’ radios will survive a light scale EMP attack.

Similar protective circuits should also be required for base stations (fixed stations) serving public service first responders such as police, fire, and ambulances. The protective circuits should be installed in the feed line path from the output of the base station transceiver to its antenna. This protection would help keep the base stations operational. The mandate

would not protect the two-way radios in the trucks, but we assume some of them would also remain operational after a low-intensity EMP attack.

Since one or more EMP bursts would also likely burn out some or all of the electric power grid, the broadcasting and base stations should also be required to have independent power supply to the maximum extent that is economically and logistically feasible. Over time, the FCC could phase-in a requirement that the independent power supply must come from solar power, wind power or other renewable energy sources.

This makes sense for many other mega-disaster scenarios besides an EMP strike.

At least initially, this mandate should be limited to the larger operations with the resources to accomplish it most easily. Then the mandate can be extended to smaller operations over time, much as the Emergency Alert System (EAS) mandate has been.

The EAS system should also be shielded against EMP waves.

### **Schedule for Adopting EMP Regulations**

It is likely to take at least 2 or 3 years for North Korea or Pakistan to develop the hydrogen warheads needed for a nationwide EMP attack against the United States. It will probably take Iran several years more.

Also, North Korea's long range rockets need to be tested further, and those of Pakistan and Iran need to be developed in the first place.

Although our nation already faces the risk of metropolitan area EMP

strikes from North Korea, and “localized” threats from non-nuclear EMP devices, the country as a whole is probably safe for a little while longer. Thus, the FCC can require that broadcast stations and public service base stations install protective circuitry by July 1, 2008. The independent power supply requirement could be phased in, beginning with larger operations, on July 1, 2009. God willing, this timetable should provide time for compliance before an EMP threat of nationwide scale becomes immediate.

### **Conclusion**

For the reasons set forth herein, we urge the Federal Communications Commission to adopt the recommendations we have presented.

**Respectfully Submitted,**

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